VARIABLE VECHANICAL / F AIR MECH AH1NW-11
AH2NW-19
AH2NW-20
AH3NW-27 AR R AR R ECTRICAL NOTES: SEE SUPPLY FAN USTOM <u>IERAL NOTES:</u> VFD'S SHALL ALL BE MANUFACTURED BY ABB. OTHER VFD BRANDS WILL VFD EQUIPMENT SHALL HAVE STANDARD SHORT—CIRCUIT CURRENT RATING VFDS TO HAVE INTEGRAL DISCONNECT UNLESS NOTED OTHERWISE. HANICAL NOTES:

MANUFACTURER MAY SELECT FAN ARRAY SIZE OF THEIR PREFERENCE. HOWEVER, AT LEAST ONE(1) SUPPLY, AND ONE(1) RETURN, FAN SHAMANUFACTURER SHOULD PROVIDE ALTERNATE LINE ITEM PRICING FOR THE UNIT COST OF EACH ADDITIONAL FAN AND MOTOR TO BE PROVIDE PROVIDE SPLIT OUTDOOR AIR INTAKE DAMPERS WITH INSULATED CONTROL BLADES. ONE DAMPER SIZED FOR MINMUM O.A. INTAKE (POSTIC FOR PROVIDE SPLIT OUTDOOR AIR INTAKE DAMPER BUT W/O AIRFLOW SENSOR). SIZE DAMPER SIZE PARTO BASED ON MINIMUM INTAKE (POSTIC FOR PROVIDE ALL NEW SUPPLY, AND RETURN FANS, WITH SPRING TYPE VIBRATION ISOLATORS AND PIEZO RINGS, OR ALTERNATE METHOD OF AIR HANDLING UNIT MANUFACTURER TO PERFORM AIRFLOW PRESSURE LEAK TESTING, AND FLOOR FLOOD TESTING, ON SITE AND SUBMIT REPROVIDE BACKDRAFT, OR MOTORIZED, DAMPERS FOR ALL SUPPLY AND RETURN FANS. PROVIDE NECESSARY CONTROLS TO ISOLATE OFF EACH OUTSIDE AIR INSULATED WALLS WITH 16 GA GALVANIZED STEEL EXTERIOR PANELS AND 20 GA INTERIOR 304 STAINLESS LINER WITH OUTSIDE AIR INTAKES ARE SHOWN FOR BOTH NORMAL OPERATING CONDITIONS, AND BACKFEED CONDITION. ALL COOLING BLENDER SECTION ALL DAMPERS TO BE PROVIDED BY THE UNIT MANUFACTURER WITH AIRFOIL BLADES. DAMPER ACTUATORS ARE TO BE PROVIDED BY THE CRETURN AIR, AND ON UNITS #19 AND #20 ADDITIONAL CONTROL DAMPERS FOR BYPASS ARE TO BE PROVIDED BY THE CRETURN AIR, AND ON UNITS #19 AND #20 ADDITIONAL CONTROL DAMPERS FOR BYPASS OPERATION CONTROL (refer to note #9). O.A. IN HANICAL NOTES:
CONTRACTOR TO PROVIDE ADDITIONAL FIELD MEASUREMENTS TO CONFIRM THAT RACK, AND DOUBLE PITCHED DRAIN PAN, WILL HAVE EN CONTRACTOR TO PROVIDE ADDITIONAL FIELD MEASUREMENTS TO CONFIRM THAT RACK DETAILS REQUIRED FOR COMPLETE I REFER TO DETAILS FOR ALL PIPING COMPONENTS, DRAIN PANS INSTALLATION, AND SUPPORT RACK DETAILS REQUIRED FOR COMPLETE I COOLING COILS SHALL BE PROVIDED WITH STEEL CASINGS AND RACK. CONFIRM THAT ALL MOUNTING HARDWARE IS ALL SURGERY UNITS #19 AND #20 BOTH SHALL BE PROVIDED WITH AIRFOIL BLADE CONTROL DAMPERS FOR PARTIAL BYPASS AROUND COOLING COILS FOR AH2NW-20 ARE SHOWN WITH 2-VALUES. LOWER CAPACITY INDICATE NORMAL OPERATING CONDITION. HOWEVER, HANICAL NOTES:
INCLUDE FULL MOUNTING RACK WITH CLAMPING MECHANISMS AT EACH CORNER, OR EDGE, FOR FULINCLUDE MAGNAHELIC GAUGE, IN ADDITION TO DIGITAL PRESSURE SENSORS PROVIDED BY CONTROLS BALANCING CONTRACTOR SHALL MEASURE LEAKAGE AROUND PERIMETER OF EACH FINAL FILTER AND FILTER CONDITIONS SHOWN ARE FOR FULL BYPASS MODE OF OPERATION AT 60,000 CFM. LOWER IS HANDLING (23413 HANDLING UNIT HANDLING HANDLING 12 12 NOTES:
PREFILTERS WITH ANGLED RACK TO REDUCE MAGNAHELIC GAUGE, IN ADDITION TO DIGITAL CONSTRUCTION FILTERS. REPLACE FILTERS ONDITIONS SHOWN ARE FOR FULL BYPASS M APPLICATION
EMERGENCY
DEPARTMENT AHU
SERVED
AH1NW-11
AH2NW-19
AH2NW-20
AH3NW-27 NOTES: SIZED UNITS UNITS SERVED
AH1NW-11
AH2NW-19
AH2NW-20
AH3NW-27 AH2NW-19 AH2NW-20 AH3NW-27 or 4 PACKAGED W - | - | | FOR #19 #19 TYPE

1 4"PLEATED

3 4"PLEATED

4"PLEATED

7 4"PLEATED AND AND QUENCY 36,000/40,000* 24,000/40,000* 42,000 UNIT UNIT 7 O.A #20 #20 BOTH BOTH CFM
T 21,000
36,000/60,000
24,000/60,000
T 42,000 AR NG SMO SHALL SHALL MOTOR FINAL ᇤ PRE COILS 2 . DEE COOLING HANDLING ATING PURGE. PROVIDE 1/3 AND 2/3 CONTROL VALVES PROVIDED WITH AIRFOIL BLADE CONTROL DAMPERSOWN DISCHARGE TEMPERATURE TO DECREASE DOWN FILTE YES YES N/A N/A NUMBER OF SIZE (I)

MODULES (I)

X 24

D X 24

X 24

X 24 EACH COIL SIZE (W"xH") 106"x30" 114" x48" 114" x48" 130" x46" FACE VELOCITY BELOW 500 FPM DURING HIGHER AIRFLOW B. PRESSURE SENSORS PROVIDED BY CONTROLS CONTRACTOR, PRIOR TO OCCUPANCY AND PROVIDE OWNER WITH COMPLETE 10DE OF OPERATION AT 60,000 CFM. LOWER FLOW NORMAL FILTE CONTROLLE **GENERAL** ROWS existing 2 R COIL 10,000/18,000 8,000/18,000 10,500 GENERAL CONTRACTOR AND/OR ALL SUBCONTRACTORS SHALL FIELD VERIFY RESPONSIBLE FOR VARIATIONS BETWEEN PLAN DIMENSIONS AND ACTUAL FIELD THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER IN WRITING PRIOR THE WORK WILL BE MADE WITHOUT THE PRIOR APPROVAL OF THE PROJECT CEILING & FLOORS. ANY AND ALL CUTTING OF CONCRETE FLOORS, WALLS OF RESPONSIBILITY. CORE DRILLING THROUGH CONCRETE WALLS, FLOORS OR SINGEONTRACTOR. REMOVAL OF DEBRIS RESULTING FROM DEMOLITION, CUTTING GENERAL CONTRACTOR. PATCHING AND REPAIR OF CONCRETE WALLS, FLOOR GENERAL CONTRACTOR; THIS WILL BE ACCOMPLISHED UPON COMPLETION OF BY THE VARIOUS SUBCONTRACTORS. ス SCHEDULE UNIT ZE PER MODULE
(H"xL"xD")
24"X24"X12"
24"X24"X12"
24"X24"X12"
24"X24"X12" 8 8 8 ROWS SCHEDULE SCHEDULE SCHEDUL NOT BE HIGHER ®Ŗ EAT (F) exist -16 exist АНUCC 19 АНUCC 20 АНUCC 27 77 HEDULE EAT

DB WB

(F) (F)

80 67

80 67

80.5 67.5

80 67 EXIST (F) EFFICIENC)
(%)
90-95%
99.99%
99.99%
90-95% CHE $\stackrel{\rightharpoonup}{\rightharpoonup}$ DULE CONSTANT TORQU
CONSTANT TORQU
CONSTANT TORQU
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CONSTANT TORQU
CONSTANT TORQU AHUHC 19
AHUHC 20
EXISTING 0 0 0 (FULL WITH SMALLER VALVE ONLY OFOR PARTIAL BYPASS AROUND TO 49 DEGREES (ADJ) PRIOR MERV RATING 14 18 18 WB (F) 51.5 48.5 51.5 CHILL CONTRACTOR, TO MEASURE PRESSIPROVIDE READINGS WITHIN BALANCIFLOW NORMAL OPERATION WILL RES STEAM APD CLEAN (IN W.C.) I 0.35" 1.25" 0.35" AHUPF 19 AHUPF 20 AHUPF 27 BRE INTEGRAL BACKFEED OPERATION,
TO MEASURE PRESSURE SET OF EXTRA FILTER
OPERATION WILL RESU APD (IN W.C.) 0.92 0.90 0.90 0.93 WATE R DOW |\foralling PERA PRE TIONAL DURING NORMAL MINIMUM O.A. INTAKE. HEAT COILS DURING BACKFEED MODE OF OPERATION. NABLING STEAM COIL, SEE SEQUENCE OF OPERATIONS ER RACKS TO HAVE KNIFE EDGE SEAL. JRE DROP ACROSS FILTERS. NG REPORT FOR REVIEW BY ENGINEER. ULT IN LOWER VELOCITY AND PD. ACE/BYPASS SHOULD BE FULLY REDUNDANT WITH THE REMAINDER BEING SIZED FOR THE FULL UNIT CAPAC WIDED FOR EMERGENCY REPLACEMENT (TO BE STORED ON SITE BY OWNER).

SITIONED ON TOP OF UNIT WITH AIRFLOW SENSOR FURNISHED BY UNIT MANUFACTURER) AND AN VOLUMES LISTED ON THIS EQUIPMENT SCHEDULE.

AIRFLOW MEASUREMENT, FOR ENTIRE SUPPLY/RETURN AIRFLOW RATE MONITORING.

REPORT TO ENGINEER/OWNER (SEE SPECIFICATIONS).

EACH INDIVIDUAL FAN, WITHOUT AFFECTING UNIT PERFORMANCE, WHEN NECESSARY.

WITH ANTI-MICROBIAL COATING IN ALL SECTIONS. FLOORS HEAVY GAUGE ALUMINUM CHECKER PORTION DURING BACKFEED MODE OF OPERATION. REFER TO MANUFACTURER DRAWINGS.

E CONTROLS CONTRACTOR. CONTROL DAMPERS INCLUDE O.A. INTAKE (x2 per note 3), RELIEF INTAKE AND RELIEF DAMPERS SHALL HAVE INSULATED BLADES WITH INTEGRAL THERMAL BREAK OUGH CLEARANCE WITHIN EXISTING UNIT CASING.
ISTALLATION.
O CORROSION RESISTANT.
ING COILS DURING BACKFEED MODE OF OPERATION.
OILS SHALL BE SIZED FOR HIGHER CAPACITY VALUE STEAM D MINIMIZE PRESSURE DROP.

DROP ACROSS FILTERS.

(FOR A TOTAL 3 SETS OF PREFILTERS).

IN LOWER VELOCITY AND PD. FOR 6%0000 1. INTENT OF BACKFEED MODE OF OPERATION, IN WHICH EITHER UNIT WILL SERVES ALL OPERATING ROOM AREAS SIMULTANEOUSLY, IS INTENDED MAINLY FOR THE ABILITY TO TAKE ONE AHU OFFLINE FOR PERIODIC MAINTENANCE. IT IS NOT THE INTENT TO BE USED UNDER EMERGENCY UNLESS OUTDOOR AIR CONDITIONS ARE TEMPERATE/MILD AT TIME OF EMERGENCY. THE FOLLOWING ARE NOT SIZED FOR FULL BACKFEED MODE OF OPERATION UNDER FULL 60,000 CFM BACKFEED.

1.1. BLENDER SIZED FOR NORMAL OPERATION ONLY **

1.2. COOLING COIL SIZED FOR NORMAL OPERATION ONLY **

1.3. HUMIDIFIER SIZED FOR NORMAL OPERATION ONLY 1.4. MIN. OUTSIDE AIR REQUIRES ECONOMIZER DAMPER TO PARTIALLY OPEN.

1.5. AHU SHOULD BE CAPABLE TO OPERATE IN ECONOMIZER MODE DURING BACKFEED MODE CONDITION IF O.A. CONDITIONS PERMIT

1.6. PER FGI, BOTH PRE AND FINAL FILTERS ARE SIZED FOR BACKFEED MODE 1.7. IFB PREHEAT COIL INTENTED FOR NORMAL OPERATION

1.7.1. PREHEAT SIZED FOR SMOKE PURGE, SO IT MAY MANAGE LOWER O.A. ** BYPASS DAMPERS PROVIDED ON THESE SECTIONS WILL OPEN TO DECREASE AIR VELOCITY THROUGH SECTIONS NOT SIZED FOR THE FULL 60,000 CFM MODE. SENSIBLE CAPACITY (MBH) 642 BACKFEED MODE OF OPERATION CAN ONLY BE MANUALLY ENGAGED BY VA FACILITIES THROUGH THE BUILDING AUTOMATION. BAC WILL SHUT DOWN BOTH AIR HANDLERS BRIEFLY AND AUTOMATICALLY CYCLE ALL DAMPER ACTUATORS TO THE APPROPRIATE POSITIONS BEFORE RAMPING UP THE FANS WITHIN THE AIR HANDLER SELECTED TO BACKFEED ALL AREAS. DO NOT ENGAGE BACKFEED MODE DURING PERIODS OF TIME WHERE SURGICAL CASES ARE BEING PERFORMED TO AVOID HAVING A TEMPORARY LOSS OF AIRFLOW IN THE STERILE FIELD OF THE SRUGERY ROOM DURING A PROCEDURE. REFER TO TO ALLOW SINCE MANY COMPONENTS ABOVE ARE NOT INTENDED FOR A DESIGN DAY CONDITION FOR THE BACKFEED MODE OF OPERATION THE OUTDOOR AIR CONDITIONS SHOULD BE CLOSELY MONITORED DURING THE SCHEDULED TIME FRAMES WHEN BACKFEED MODE IS ENGAGED. OUTDOOR AIR CONDITIONS SHOULD IDEALLY BE BETWEEN 32 — 60 DEGREES FAHRENHEIT. COLDER CONDITIONS MAY BE MAINTAINABLE IF THE SMOKE PURGE HEATING COIL CONTROL VALVE IS ALLOWED TO MODULATE. WARMER CONDITIONS MAY SEE HUMIDITY LEVELS WITHIN OPERATING ROOMS TO TO RISE DEPENDING ON OUTDOOR RH CONDITIONS. DUNHAM MANUFACTURER DRAWINGS. SWITCHING WITH AH2NW-19 CUSTOM 1,2,3,4,5,6,7,9,10 1,2,3,4,5,6,7,9,10 1,2,4,6

 TAG
 HP/LOAD
 \text{AHUS 11}
 32 HP(total)
 \text{AHUS 19}

 AHUS 19
 100 HP(total)
 AHUS 20
 100 HP(total)

 AHUS 27
 60 HP(total)

 ECHANICAL NOTES:

PROVIDE NEW SHEAVES AND BELT
ALL RETURN FANS, BOTH NEW AN
ALL NEW RETURN FANS SHALL BE
RETURN AIRFLOW RATINGS ARE LIT
REPLACE MOTOR ON EXISTING RE
REPLACEMENT BELTS AND SHEAVE CHANICAL NOTES: BALANCE DIFFUSER CIRICAL NOTES:
SEE SCHEMATIC WIRING DRAWINGS FOR ADDITIONAL SEE SCHEMATIC WIRING DRAWINGS FOR ADDITIONAL LABEL EXISTING CIRCUIT 4 BREAKER AS "SPARE". LABEL EXISTING CIRCUIT 3 BREAKER AS "SPARE". UTILIZE EXISTING SPACE FOR NEW BREAKER. PROVIDE OPEN TRANSITION MANUAL CHANGE OVER PROVIDE OPEN TRANSITION MANUAL CHANGE OVER HANICAL NOTES:

COORDINATE MANIFOLD LENGTH WITH CONTRACTOR PRIOR TO DELIVERY TO INSURE ADEQUATE CLEARANCES NEEDED FOR CONTROLS AND PIPING CONNECTIONS.

VERIFY THAT DRAIN PAN EXTENDS WELL BEYOND CALCULATED ABSORPTION DISTANCE LISTED ON MANUFACTURER'S SUBMITTAL INFORMATION.

TWO DIFFERENT AIRFLOW DESIGN VALUES ARE SHOWN ON THIS SCHEDULE. HUMIDIFIER TO BE SIZED BASED ON THE LARGER AIRFLOW DURING ECONOMIZER MODE HUMIDIFIER TO HAVE SECONDARY STEAM CONNECTION FOR HEAT EXCHANGER WITHIN BOTTOM HEADER TO REHEAT ALL CONDENSATE BACK INTO STEAM. REFER TO STRICAL NOTES:
SEE SCHEMATIC WIRING DRAWINGS FOR ADDITIONAL INFORMATION.
PROVIDE CONNECTION TO AIR HANDLING UNIT CONVENIENCE RECEPT.
USE EXISTING SPACE FOR NEW BREAKER. ERAL ELECTRICAL NOTES: WHEN THE CONTROLLER CONTROLLER HANDLING HANDLING HANDLING AHU SERVED
AH1NW-11
AH2NW-19
AH2NW-20
AH3NW-27 AIR (2327 I havely cartly that this plan, assocification, or inport was proposed by me or under my direct supervision and that I am a daily Licensed Professional Explanar under the large of the State of Massocia.

JASON GOTTWALT, PE

Date 08/08/2014 Reg. No.41360

Drawing Scale

AS NOTED 3) UN TYPE OR TH OR THE IS A VFD OR MAGNETIC STARTER, REFER TO MAGNETIC STARTER SCHEDULE FOR MORE IT FOR EXISTING FAN TO ACHIEVE RPM LISTED ON SCHEDULE. REFER TO ELECTRICAL TO DETERMINE IF MOTOR REPLACEMENT IS REQUIRED. AND EXISTING, SHALL BE PROVIDED WITH NEW VFC'S TO MODULATE AIRFLOW AS INDICATED ON SEQUENCE OF OPERATION. BE PROVIDED AS U.L. 793 COMPLIANT FOR HIGH TEMPERATURE SMOKE PURGE EXHAUST PER NFPA REQUIREMENTS. LISTED FOR BOTH NORMAL OPERATION, AND BACKFEED OPERATION OF ADJACENT SURGICAL AHU. SIZE FANS APPROPRIATELY TO WORK EFFICENCY. REFER TO DRAWING FOR REDUNDANT VFD INSTALLATION WITH MANUAL SELECTOR SWITCH. CKFEED CONDITION OF BOTH UNITS. NORMAL OPERATING CONDITION FOR AH2NW-19 APPROX 36,000 CFM, AND FOR AH2NW-20 IS 24,000 CFM. COILS/HUMIDIFIER TO LOWANCE FOR SPARE FUTURE CAPACITY. PRESENT OPERATING CONDITIONS FOR AH1NW-11 IS 13,500 CFM* AND FOR AH3NW-27 IS 30,000 CFM. COILS/HUMDIFIER TO FOR NORMAL OPERATING CONDITIONS ONLY FOR ALL AHU'S (refer to note #1 on AHU schedule). BACKFEED CONDITION WILL NOT REQUIRE FAN REDUNDANCY.

WITH DEDICATE VFD SPEED CONTROLLER. ALL VFD'S TO BE MOUNTED WITHIN VENTED ENCLOSURE WITH REMOTE LCD PANELS THAT DISPLAY DRIVE CONDITION EXTERNAL OF REMOTE FORM FACTORY WITH SINGLE POINT OF CONNECTION FOR MAIN POWER SERVICE BY ELECTRICAL CONTRACTOR. INCLUDE INDIVIDUAL DISCONNECTS FUSES INSIDE PANELY INDIVIDUAL BACKDRAFT DAMPERS. CONTRACTOR TO AUTOMATE FAN OPTIMIZATION TO ALLOW EQUAL RUN TIME ON EACH FAN IF SOME ARE NOT REQUIRED. A VFD OR MAGNETIC STARTER, REFER TO THE VARIABLE MAGNETIC STARTER SCHEDULE FOR MORE INFORMATION. HUMIDIFIER RETURN SCHEDUL FOR MECHANICAL CHE SCHEDULE SCHEDULE ATING

T STEAM SSURE PSIG)
30
30
30

model XV
model XV

model XV

XV

DIAGRAM DIAGRAM

SHEET ES1.0 SHEET ES1.0

FOR

TROLLER TYPES:

- VARIABLE FREQUENCY MOTOR CONTROLLER

- MANUAL MOTOR STARTER (WITH OVERLOADS)

- CONTROL PANEL

STARTER
RATED SWITCH (WITHOUT OVERLOADS)
WITH BYPASS OPTION AND EXTERNAL STARTER

CONDUIT/FEEDER SIZE

/4"C. - 3#12 & #12 GND

) 3/4"C. - 3#8 & #10 GND

) 3/4"C. - 3#8 & #10 GND

3/4"C. - 3#8 & #10 GND

1,3,4,6

ELECTRICAL NOTES

STARTER RATED SWITCH (WITHOUT OVERLOADS) WITH BYPASS OPTION AND EXTERNAL STARTER

- 3#1/0 & #6 GND - 3#3/0 & #6 GND - 3#3/0 & #6 GND - 3#3/0 & #6 GND C. - 3#3 & #6 GND

1,2 1,2 1,2 1,2

LO LO

TION #2

MODEL # N
3-686q1600

ACFQ2 SW

ACFQ2 SW

3-686q1000

MECHANICAL NOTES
2,3,4,5,6
1,3,4,5,6
1,3,4,5,6
2,3,4,5,6

BE SIZED ON SCHEDULED AIRFIBE SIZED FOR FUTURE ALSO.

ENCLOSURE. _ FOR SERVICE OF EACH VFD. DURING NORMAL OPERATION.

Plot Scale 12" 1,-0,

SCHEDULES

V.A. MEDICAL CENTER
ONE VETERANS DRIVE
MINNEAPOLIS, MN 55417

Checked | Drawn
JRG | JG/RF UPGRADE AHU'S PHASE 2 Building **70** 618-13-130

1272-70-M4.2

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